



1. Description

1.1. Project

Project Name	f3-traffic-light
Board Name	STM32F3DISCOVERY
Generated with:	STM32CubeMX 6.16.0
Date	11/21/2025

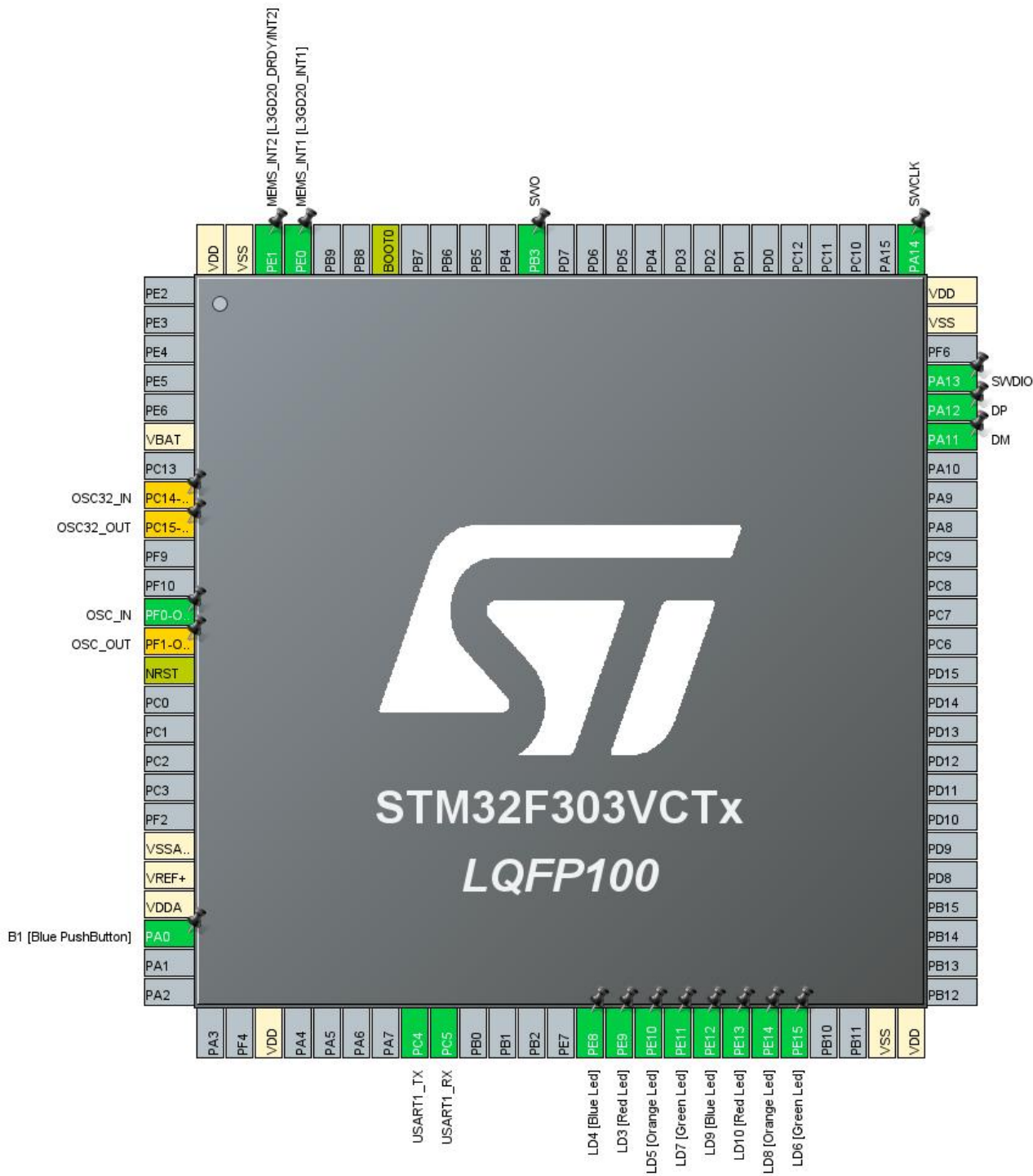
1.2. MCU

MCU Series	STM32F3
MCU Line	STM32F303
MCU name	STM32F303VCTx
MCU Package	LQFP100
MCU Pin number	100

1.3. Core(s) information

Core(s)	Arm Cortex-M4
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2. Pinout Configuration



3. Pins Configuration

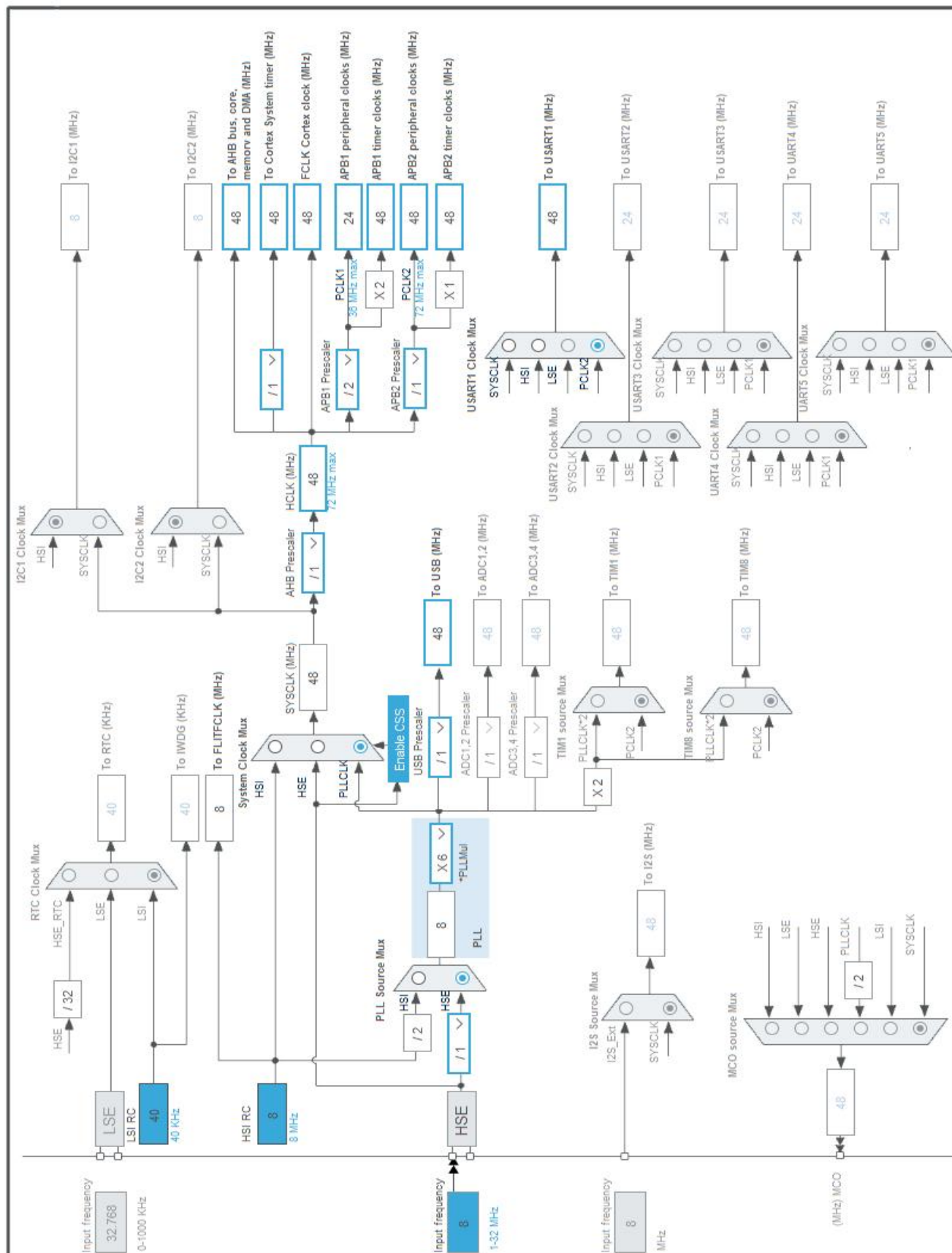
Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
8	PC14-OSC32_IN *	I/O	RCC_OSC32_IN	OSC32_IN
9	PC15-OSC32_OUT *	I/O	RCC_OSC32_OUT	OSC32_OUT
12	PF0-OSC_IN	I/O	RCC_OSC_IN	OSC_IN
13	PF1-OSC_OUT *	I/O	RCC_OSC_OUT	OSC_OUT
14	NRST	Reset		
20	VSSA/VREF-	Power		
21	VREF+	Power		
22	VDDA	Power		
23	PA0 **	I/O	GPIO_Input	B1 [Blue PushButton]
28	VDD	Power		
33	PC4	I/O	USART1_TX	
34	PC5	I/O	USART1_RX	
39	PE8 **	I/O	GPIO_Output	LD4 [Blue Led]
40	PE9 **	I/O	GPIO_Output	LD3 [Red Led]
41	PE10 **	I/O	GPIO_Output	LD5 [Orange Led]
42	PE11 **	I/O	GPIO_Output	LD7 [Green Led]
43	PE12 **	I/O	GPIO_Output	LD9 [Blue Led]
44	PE13 **	I/O	GPIO_Output	LD10 [Red Led]
45	PE14 **	I/O	GPIO_Output	LD8 [Orange Led]
46	PE15 **	I/O	GPIO_Output	LD6 [Green Led]
49	VSS	Power		
50	VDD	Power		
70	PA11	I/O	USB_DM	DM
71	PA12	I/O	USB_DP	DP
72	PA13	I/O	SYS_JTMS-SWDIO	SWDIO
74	VSS	Power		
75	VDD	Power		
76	PA14	I/O	SYS_JTCK-SWCLK	SWCLK
89	PB3	I/O	SYS_JTDO-TRACESWO	SWO
94	BOOT0	Boot		
97	PE0	I/O	GPIO_EXTI0	MEMS_INT1 [L3GD20_INT1]
98	PE1	I/O	GPIO_EXTI1	MEMS_INT2 [L3GD20_DRDY/INT2]
99	VSS	Power		

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
100	VDD	Power		

** The pin is affected with an I/O function

* The pin is affected with a peripheral function but no peripheral mode is activated

4. Clock Tree Configuration



1. Power Consumption Calculator report

1.1. Microcontroller Selection

Series	STM32F3
Line	STM32F303
MCU	STM32F303VCTx
Datasheet	DS9118_Rev13

1.2. Parameter Selection

Temperature	25
Vdd	3.6

1.3. Battery Selection

Battery	Li-SOCL2(A3400)
Capacity	3400.0 mAh
Self Discharge	0.08 %/month
Nominal Voltage	3.6 V
Max Cont Current	100.0 mA
Max Pulse Current	200.0 mA
Cells in series	1
Cells in parallel	1

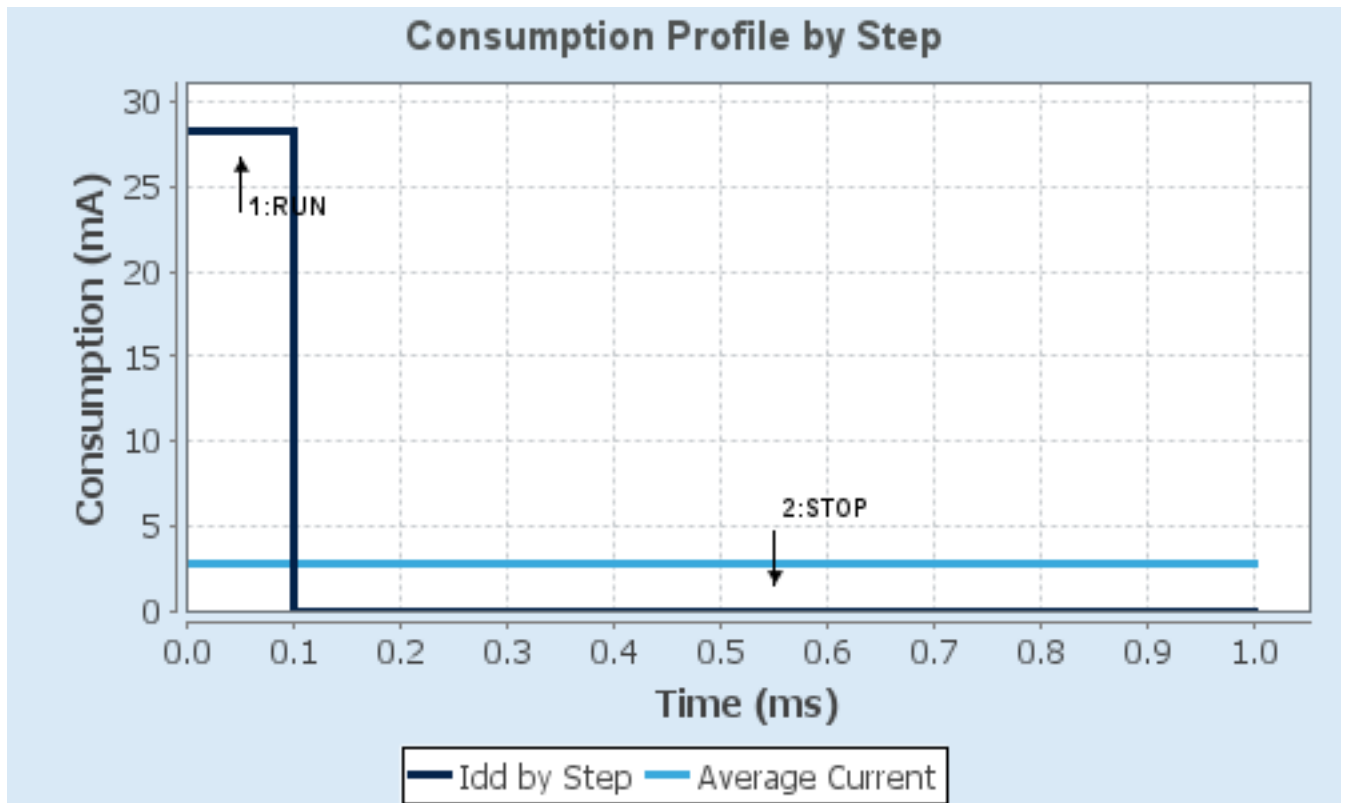
1.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	3.6	3.6
Voltage Source	Battery	Battery
Range	No Scale	No Scale
Fetch Type	FLASH	n/a
CPU Frequency	72 MHz	0 Hz
Clock Configuration	HSE PLL	Regulator LP
Clock Source Frequency	8 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	28.24 mA	10.85 μ A
Duration	0.1 ms	0.9 ms
DMIPS	63.0	0.0
Ta Max	100.83	105
Category	In DS Table	In DS Table

1.5. Results

Sequence Time	1 ms	Average Current	2.83 mA
Battery Life	1 month, 19 days, 12 hours	Average DMIPS	63.0 DMIPS

1.6. Chart



2. Software Project

2.1. Project Settings

Name	Value
Project Name	f3-traffic-light
Project Folder	D:\projects\2025-speech-last-mile\f3-traffic-light
Toolchain / IDE	CMake
Firmware Package Name and Version	STM32Cube FW_F3 V1.11.5
Application Structure	Advanced
Generate Under Root	No
Do not generate the main()	No
Minimum Heap Size	0x200
Minimum Stack Size	0x400

2.2. Code Generation Settings

Name	Value
STM32Cube MCU packages and embedded software	Copy only the necessary library files
Generate peripheral initialization as a pair of '.c/.h' files	No
Backup previously generated files when re-generating	No
Keep User Code when re-generating	Yes
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	No
Enable Full Assert	No

2.3. Advanced Settings - Generated Function Calls

Rank	Function Name	Peripheral Instance Name
1	SystemClock_Config	RCC
2	MX_GPIO_Init	GPIO
3	MX_USB_DEVICE_Init	USB_DEVICE
4	MX_USART1_UART_Init	USART1

3. Peripherals and Middlewares Configuration

3.1. RCC

High Speed Clock (HSE): BYPASS Clock Source

3.1.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Prefetch Buffer	Enabled
Flash Latency(WS)	1 WS (2 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

3.2. SYS

Debug: Trace Asynchronous Sw

Timebase Source: SysTick

3.3. USART1

Mode: Asynchronous

3.3.1. Parameter Settings:

Basic Parameters:

Baud Rate	115200 *
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples
Single Sample	Disable

Advanced Features:

Auto Baudrate	Disable
TX Pin Active Level Inversion	Disable
RX Pin Active Level Inversion	Disable
Data Inversion	Disable
TX and RX Pins Swapping	Disable

Overrun	Enable
DMA on RX Error	Enable
MSB First	Disable

3.4. USB

mode: Device (FS)

3.4.1. Parameter Settings:

Basic Parameters:

Speed	Full Speed 12MBit/s
Physical interface	Internal Phy

Power Parameters:

Low Power	Disabled
Battery Charging	Disabled

3.5. USB_DEVICE

Class For FS IP: Custom Human Interface Device Class (HID)

3.5.1. Parameter Settings:

Class Parameters:

CUSTOM_HID_FS_BINTERVAL	0x5 *
USBD_CUSTOM_HID_REPORT_DESC_SIZE (Total length for Report descriptor (IN ENDPOINT))	27 *
USBD_CUSTOMHID_OUTREPORT_BUF_SIZE (Maximum report buffer size (OUT ENDPOINT))	2

Basic Parameters:

USBD_MAX_NUM_INTERFACES (Maximum number of supported interfaces)	1
USBD_MAX_NUM_CONFIGURATION (Maximum number of supported configuration)	1
USBD_MAX_STR_DESC_SIZ (Maximum size for the string descriptors)	512
USBD_SELF_POWERED (Enabled self power)	Enabled
USBD_DEBUG_LEVEL (USBD Debug Level)	0: No debug message

3.5.2. Device Descriptor:

Device Descriptor:

VID (Vendor Identifier)	1155
LANGID_STRING (Language Identifier)	English(United States)

MANUFACTURER_STRING (Manufacturer Identifier)

STMicroelectronics

Device Descriptor FS:

PID (Product Identifier)

22352 *

PRODUCT_STRING (Product Identifier)

STM32 Custom Human interface

CONFIGURATION_STRING (Configuration Identifier)

Custom HID Config

INTERFACE_STRING (Interface Identifier)

Custom HID Interface

*** User modified value**

4. System Configuration

4.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
RCC	PF0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	OSC_IN
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	SWDIO
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	SWCLK
	PB3	SYS_JTDO-TRACESWO	n/a	n/a	n/a	SWO
USART1	PC4	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PC5	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	High *	
USB	PA11	USB_DM	Alternate Function Push Pull	No pull-up and no pull-down	High *	DM
	PA12	USB_DP	Alternate Function Push Pull	No pull-up and no pull-down	High *	DP
Single Mapped Signals	PC14-OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	OSC32_IN
	PC15-OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	OSC32_OUT
	PF1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	OSC_OUT
GPIO	PA0	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	B1 [Blue PushButton]
	PE8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD4 [Blue Led]
	PE9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD3 [Red Led]
	PE10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD5 [Orange Led]
	PE11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD7 [Green Led]
	PE12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD9 [Blue Led]
	PE13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD10 [Red Led]
	PE14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD8 [Orange Led]
	PE15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD6 [Green Led]
	PE0	GPIO_EXTI0	External Event Mode with Rising edge trigger detection *	No pull-up and no pull-down	n/a	MEMS_INT1 [L3GD20_INT1]
	PE1	GPIO_EXTI1	External Event Mode with Rising edge trigger detection *	No pull-up and no pull-down	n/a	MEMS_INT2 [L3GD20_DRDY/INT2]

4.2. DMA configuration

nothing configured in DMA service

4.3. NVIC configuration

4.3.1. NVIC

Interrupt Table	Enable	Preenmption Priority	SubPriority
Non maskable interrupt	true	0	0
Hard fault interrupt	true	0	0
Memory management fault	true	0	0
Pre-fetch fault, memory access fault	true	0	0
Undefined instruction or illegal state	true	0	0
System service call via SWI instruction	true	0	0
Debug monitor	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	0	0
USB low priority or CAN_RX0 interrupts	true	0	0
PVD interrupt through EXTI line16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
USB high priority or CAN_TX interrupts	unused		
USART1 global interrupt / USART1 wake-up interrupt through EXTI line 25	unused		
USB high priority interrupt remap	unused		
USB low priority interrupt remap	unused		
Floating point unit interrupt	unused		

4.3.2. NVIC Code generation

Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Non maskable interrupt	false	true	false
Hard fault interrupt	false	true	false
Memory management fault	false	true	false
Pre-fetch fault, memory access fault	false	true	false
Undefined instruction or illegal state	false	true	false
System service call via SWI instruction	false	true	false
Debug monitor	false	true	false
Pendable request for system service	false	true	false
System tick timer	false	true	true
USB low priority or CAN_RX0 interrupts	false	true	true

* User modified value

5. System Views

5.1. Category view

5.1.1. Current

Middleware					
USB_DEVICE ✓					
System Core	Analog	Timers	Connectivity	Multimedia	Computing
DMA			USART1 ✓		
GPIO ⚠			USB ✓		
NVIC ✓					
RCC ✓					
SYS ✓					

6. Docs & Resources

Type	Link
BSDL files	https://www.st.com/resource/en/bsdl_model/stm32f3_bsdل.zip
System View Description	https://www.st.com/resource/en/svd/stm32f3-svd.zip
Presentations	https://www.st.com/resource/en/product_presentation/stm32-stm8_embedded_software_solutions.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32_eval-tools_portfolio.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32_stm8_functional-safety-packages.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32-stm8_software_development_tools.pdf
Presentations	https://www.st.com/resource/en/product_presentation/microcontrollers-stm32-family-overview.pdf
Brochures	https://www.st.com/resource/en/brochure/products-and-solutions-for-plcs-and-smart-i-os.pdf
Brochures	https://www.st.com/resource/en/brochure/expansion-boards-for-intelligent-power-switches.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32nucleo.pdf
Flyers	https://www.st.com/resource/en/flyer/flpowerstbd.pdf
Flyers	https://www.st.com/resource/en/flyer/fldpstpfc11120.pdf
Product Certifications	https://www.st.com/resource/en/certification_document/stm32_authentication_can.pdf
Security Bulletin	https://www.st.com/resource/en/technical_note/tn1489-security-bulletin-tn1489stpsirt-physical-attacks-on-stm32-and-stm32cube-firmware-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an1709-emc-design-guide-for-stm8-stm32-and-legacy-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3126-audio-and-waveform-generation-using-the-dac-in-stm32-products-

stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an3155-usart-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an3156-usb-dfu-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an3371-using-the-hardware-realtime-clock-rtc-in-stm32-f0-f2-f3-f4-and-l1-series-of-mcus-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4045-stm32f3-series-in-application-programming-iap-using-the-usart-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4076-two-or-three-shunt-resistor-based-current-sensing-circuit-design-in-3phase-inverters-stmicroelectronics.pdf

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Application Notes https://www.st.com/resource/en/application_note/an4195-stm32f30x-adc-modes-and-application-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4206-getting-started-with-stm32f3-series-hardware-development-stmicroelectronics.pdf

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stmicroelectronics.pdf

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- Application Notes https://www.st.com/resource/en/application_note/an4734-stm32cube-firmware-examples-for-stm32f3-series-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an4750-handling-of-soft-errors-in-stm32-applications-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an4776-generalpurpose-timer-cookbook-for-stm32-microcontrollers-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an4803-highspeed-si-simulations-using-ibis-and-boardlevel-simulations-using-hyperlynx-si-on-stm32-mcus-and-mpus-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an4807-migrating-between-stm32f303-and-stm32f302-line-products-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an4832-migrating-from-stm32f303-line-to-stm32l4-series-and-stm32l4-series-microcontrollers-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an4989-stm32-microcontroller-debug-toolbox-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an5027-interfacing-pdm-digital-microphones-using-stm32-mcus-and-mpus-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an5310-guideline-for-using-analog-features-of-stm32g4-series-versus-stm32f3-series-devices-stmicroelectronics.pdf
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- Application Notes https://www.st.com/resource/en/application_note/an2548-introduction-to-dma-controller-for-stm32-mcus-stmicroelectronics.pdf
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- Application Notes https://www.st.com/resource/en/application_note/an4759-introduction-to-using-the-hardware-realtime-clock-rtc-and-the-tamper-management-unit-tamp-with-stm32-mcus-stmicroelectronics.pdf
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Application Notes https://www.st.com/resource/en/application_note/an2656-stm32f10xxx-lcd-glass-driver-firmware-stmicroelectronics.pdf
for related Tools
& Software

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for related Tools
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Application Notes https://www.st.com/resource/en/application_note/an3116-stm32s-adc-modes-and-their-applications-stmicroelectronics.pdf
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Application Notes https://www.st.com/resource/en/application_note/an3174-implementing-receivers-for-infrared-remote-control-protocols-using-stm32f10xxx-microcontrollers-stmicroelectronics.pdf
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for related Tools
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& Software

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